

Remarks

Claims 1-14 inclusive and 16 have been canceled. Claims 15, 17-27 inclusive and new claims 28-29 inclusive remain in this application.

The Specification has been amended on page 1, line 6 to insert the application number of the related Application, as requested in Paragraph 2 of the Office Action.

Claim 15 has been amended as suggested by the Examiner and now overcomes the claim objection in Paragraph 3 of the Office Action.

A terminal disclaimer is attached to this Amendment and overcomes the provisional rejections based on obviousness-type double patenting over co-pending application 10/788,687 in Paragraphs 4-6 of the Office Action.

Because claims 1-14 have been canceled, the Section 112 rejection in Paragraphs 7-8 of the Office Action is not addressed in this Amendment.

The Section 103(a) Rejection over US Patent No. 6,794,057 B2 (Wang et al.) in view of US Patent 5,851,643 (Honda et al.) and in view of the evidence taught by WO 03/065356 A1 (Do et al.)

All remaining claims 15-27 have been rejected under Section 103(a) as being unpatentable over US Patent No. 6,794,057 B2 (Wang et al.) in view of US Patent 5,851,643 (Honda et al.) and in view of the evidence taught by WO 03/065356 A1 (Do et al.).

Wang is cited for teaching that in an AFC structure the upper layer (actually the middle layer in Wang) can have an Mrt greater than the lower layer. While Wang is of interest, it adds little to the admitted prior art. The prior art AFC structure described in Applicant's specification and shown in Fig. 2 clearly teaches that the upper layer has an Mrt greater than the Mrt of the lower layer. However, neither Wang nor the admitted prior art teach or suggest the problem to which Applicants' invention is directed; namely, *how to minimize the difference in the upper and lower Mrt values (the Mrt_{COMPOSITE}) without causing a reduction in media signal-to-noise ratio (SNR).*

Honda is cited for teaching that a conventional *single-layer recording layer* can be replaced with multiple layers coupled across ferromagnetically-coupling layers to increase the coercivity of the *recording layer* above that of a single-layer recording layer. However, the Honda multiple-layer structure is intended for use as a replacement for a *single-layer*

recording layer. There is no suggestion that the Honda structure could be used to replace the *lower layer in an AFC structure*. In fact, Honda *teaches away* from this because the purpose of the Honda structure is to *increase coercivity* of the recording layer, while it is well-known that in an AFC structure, the lower layer is intended to have *low coercivity* and *can not be used as the recording layer*. This is explained in Applicant's specification at page 6, lines 23-27.

The basis for the obviousness rejection is stated in paragraph 10 of the Office Action as follows: it would be obvious to "modify the device of Wang et al. to use a plurality of FM layers *as the lower layer FM layer* as taught by Honda et al. *since such a structure results in improved coercivity...*" (italics added). Thus this obviousness rejection is based on an incorrect motivation to increase coercivity. Since it is clear that a *low coercivity lower layer* is desirable in an AFC structure, the proposed combination of Honda with Wang would result in an unacceptable AFC structure. To remove any doubt as to how Applicants' invention is distinguishable over any combination of Honda with Wang, Applicants' claim 15 has been amended to state that the upper ferromagnetic layer has "an intrinsic coercivity substantially greater than the intrinsic coercivity of each of the first and second lower ferromagnetic layers". Support for this amendment is in the specification, including at page 6, lines 19-24; page 8, lines 15-22; and page 9, lines 1-5. To be consistent with this amendment to claim 15, claim 16 has been canceled.

The Section 103(a) Rejection over US Patent 6,828,036 B1 (Munteanu et al.) in view of US Patent 6,811,890 B1 (Zhou et al.) and Wang et al. and further in view of the evidence taught Do et al.

Remaining claims 15-17 and 23-27 have been rejected under Section 103(a) as being unpatentable over US Patent 6,828,036 B1 (Munteanu et al.) in view of US Patent 6,811,890 B1 (Zhou et al.) and Wang et al. and further in view of the evidence taught Do et al.

Munteanu is cited for teaching a *non-ferromagnetically coupled bilayer* as the lower layer in an AFC structure in the embodiment of Fig. 4. The Examiner correctly points out that Munteanu also teaches that the *upper layer is thicker than the lower layer*, and also correctly relies on Wang to conclude that the Munteanu upper layer has an M_r greater than the M_r of

the lower layer (or bilayer). However, it is not necessary to rely on Wang, because Munteanu alone teaches that the Mrt of the upper layer is greater than the Mrt of the lower layer (or bilayer). This is because Munteanu is limited to an AFC structure where *the upper and lower layers have the same composition*, and thus relative Mrt values are determined solely by thickness. This is shown by Table I and II of Munteanu, wherein each of the upper layer (layer M2) and lower layer (layer M1) has the same Co/Cr/B composition as shown in the heading for the second column of the Tables.

In contrast to Munteanu, in Applicants' amended claims 15 and 23, the upper ferromagnetic layer has an "intrinsic coercivity substantially greater than the intrinsic coercivity of each of the first and second lower ferromagnetic layers", which by definition means the layers must be formed of substantially different materials, for example as recited in amended claim 23.

The Examiner has correctly cited Zhou for teaching *ferromagnetically-coupled layers as the upper layer* in an AFC structure. However, the obviousness rejection combining Zhou with Munteanu and Wang hinges on the assertion that Zhou, by virtue of a general statement that "any number of other configurations are possible" (col. 8, lines 42-43), also teaches that the ferromagnetically-coupled layers could be the *lower layer* in an AFC structure. First, Zhou does not suggest this as a possible structure. The Office Action states that this structure is in the claims, but Applicants have not identified any of the 61 claims which claim this structure. Secondly, the AFC structure of Zhou has the upper layer as the *information-containing* layer (i.e., the recording layer), and the lower layer as the *stabilizing* layer (col. 4, lines 44-50). The replacement of a *single-layer recording layer* with ferromagnetically-coupled layers as the recording layer, and the advantage provided thereby, is *well-known*. Zhou's embodiments in Figs. 14-15 are nothing more than a mere acknowledgement of this well-known type of *recording layer*. However, there is no suggestion or teaching in Zhou, or any of the other cited art, of ferromagnetically-coupled layers as the *lower* layer in an AFC structure, and no motivation in any of the cited art to so modify the *lower* layer in an AFC structure.

The Section 103(a) Rejection over Munteanu et al. in view of Zhou et al. and Wang et al. and further in view of the evidence taught Do et al., and further in view of Honda et al.

Claims 18-22, all directed to various features of the ferromagnetically-coupling layer in the lower layer, have been rejected under Section 103(a) in further view of Honda et al. However, for the reasons stated above, Applicants believe that amended independent claim 15 is allowable over the cited art, and thus dependent claims 18-22 are also allowable.

New Claims 28-29

New claim 28 is directed to a disk with an AFC structure compared to a reference AFC structure. The reference structure has upper layer with an $Mrt(UL)$ and a single lower layer with an $Mrt(SLL-Max)$, where $Mrt(SLL-Max)$ corresponds to the Mrt of a single lower ferromagnetic layer that results in the maximum achievable signal-to-noise ratio (SNR) for the reference structure. This reference structure describes the prior art problem that arises when attempting to minimize $Mrt(COMPOSITE)$ by maximizing the Mrt of the single lower layer, i.e., the intrinsic media noise becomes unacceptable, as explained in the specification at page 2, line 27 to page 3, line 6.

The AFC structure claimed in new claim 28 has an $Mrt(UL)$ substantially the same as $Mrt(UL)$ for the reference structure, but two ferromagnetically-coupled lower layers wherein the *sum of $Mrt(LL1)$ and $Mrt(LL2)$ is greater than $Mrt(SLL-Max)$* for the reference structure. Thus the claimed AFC structure has *an $Mrt(COMPOSITE)$ less than the $Mrt(COMPOSITE)$ of the reference structure*. New claim 28 further requires that the upper layer has an intrinsic coercivity substantially greater than the intrinsic coercivity of each of the first and second lower layers. Dependent claim 29 further describes the compositions of the upper and lower layers that results in this difference in intrinsic coercivity. Since none of the cited references, alone or in combination, suggest the invention as claimed in claim 28, claim 28 and dependent claim 29 are believed allowable.

In view of the above amendment and comments Applicants believe all remaining claims are in condition for allowance. The Examiner is invited to call Applicants' attorney if a telephone conference will expedite the prosecution of this application.

Respectfully submitted,

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